



## CLINICOPATHOLOGICAL PROFILE OF SINO-NASAL MASS AND THEIR RADIOLOGICAL CORRELATION.

### Radiology

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### ABSTRACT

**Introduction:** The etiology and pathophysiology of sinonasal masses are still unknown though significant knowledge has been obtained about nasal physiology and nasal masses with scientific advances in the fields of radiology, microbiology, and immunology.

**Aims:** To find out the incidence of sinonasal masses among the patients attending our ENT opd and establish the etiology of different sinonasal masses by clinical, radiological & histopathological examination. The study also aims at finding the clinical & histopathological examination(HPE) correlation of the excised sinonasal masses.

**Methods:** 50 patients presenting with sinonasal mass were evaluated clinically, endoscopically and radiologically(CT Scan). All the patients after evaluation were operated followed by HPE and its correlation with CT Scan findings was calculated.

**Conclusion:** Both nasal endoscopy and CT scan are objective measures that can increase accuracy of diagnosis in nasal pathologies. For areas that are not accessible to nasal endoscopy, CT scan can be useful in identifying disease and its extension. It is concluded that the diagnosis can be often be missed on either clinical or radiological evaluation and thus histopathological evaluation should be done in all cases of sinonasal masses for accurate diagnosis and management.

### KEYWORDS

Sinonasal mass, correlation, histopathology examination.

### INTRODUCTION

A sinonasal mass in the nasal cavity is a commonly encountered condition by the Otorhinolaryngologists. A diverse group of lesions may present themselves as sinonasal masses. They may be simple mucosal polyp or a variety of other pathological entities like granulomatous diseases, papillomas, vascular masses or malignant neoplasms<sup>1</sup>. A number of deceptively benign looking polyps often turn out to be malignant lesions or vice versa.

Clinical symptoms are obstruction of air flow through the nose, often dripping and nasal secretion, hyposmia & anosmia<sup>2,3</sup>. Systemic or intranasal steroids are commonly used in their treatment, but in cases of serious blockage or infectious complications also surgery is indicated. The recurrence of nasal polyposis constitutes a serious clinical problem. Recurrence report rates up to 29-53% . Sino- nasal masses can be a frustrating disease for the patient and for the treating physician. The etiology and pathophysiology of sinonasal masses are still unknown though significant knowledge has been obtained about nasal physiology and nasal masses with scientific advances in the fields of radiology, microbiology, and immunology<sup>4</sup>. In recent years, several studies have drawn attention to e.g. growth factors in nasal polyps. Before effective prevention and treatment of the disease can be achieved, more knowledge is needed about sino-nasal masses. This study is intended to assess and clinically differentiate the various conditions presenting as sinonasal masses to understand their exact nature by HPE and try to establish their pathogenesis, placing them under established classification and thereby learn the relative incidence of individual conditions encountered.

### AIMS & OBJECTIVES:

1. To analyse the case of sinonasal masses in respect of age and sex distribution.
2. To find out the incidence of sinonasal masses in those patient attending at ENT opd.
3. To establish the etiology of different sinonasal masses by clinical, radiological & HPE.
4. Clinical & histopathological correlation of the excised sinonasal masses.

### MATERIAL AND METHODS

Patients 50 in number presenting with signs and symptoms of sinonasal masses were included in this study according to the following criteria from January 2015 to July 2016. The patients that were included in the study were above 18 years of age, of either sex, presenting with signs and symptoms of sinonasal mass, and those who on anterior rhinoscopy revealed a nasal mass in either or both nasal cavity. Those patients with severe epistaxis suffering from any severe form of coagulation disorder and presenting with congenital sinonasal mass with a nasal mass of intra cranial origin such as basal meningocele, meningoencephalocele or nasal glioma were excluded from the study. Computerized tomographic scan of nose and paranasal sinuses (coronal and axial with or without contrast enhancement) was done in almost all cases.

Excision of the polypoidal mass with prior consent of the patient was done by transnasal, lateral rhinotomy, or endoscopic approach. All surgically excised polypoidal masses were subjected to HPE in the Department of Pathology .

### RESULT AND ANALYSIS

**Table I : Distribution of sex, age in years, occupation, duration of illness (months), ph, nasal discharge, obstruction, history of allergy, epistaxis, headache, tooth ache, proptosis, palatal bulgin, cheek swelling, visual acuity, visible nasal mass and nasal mass**

		Frequency	Percent
Sex	Female	13	26.0%
	Male	37	74.0%
	Total	50	100.0%
Age	≤29	19	38.0%
	30-39	15	30.0%
	40-49	12	24.0%
	50-59	2	4.0%
	60-69	2	4.0%
	Total	50	100.0%

Occupation	Business	7	14.0%
	Carpenter	3	6.0%
	Cultivator	4	8.0%
	Govt. Employee	4	8.0%
	Housewife	11	22.0%
	Labour	6	12.0%
	Student	15	30.0%
	Total	50	100.0%
Duration of illness	≤6	18	36.0%
	7-12	10	20.0%
	13-24	9	18.0%
	25-36	7	14.0%
	≥ 37	6	12.0%
Total	50	100.0%	
PH	Cald well lucs opn 5y bk	1	2.0%
	NoPH of surgery	45	90.0%
	Partial Maxillectomy 1y bk	1	2.0%
	Polypectomy 5y bk	2	4.0%
	RT 1996	1	2.0%
	Total	50	100.0%
NASAL DISCHARGE	NO	15	30.0%
	YES	35	70.0%
OBSTRUCTION	NO	4	8.0%
	YES	46	92.0%
HISTORY OF ALLERGY	NO	38	76.0%
	YES	12	24.0%
EPISTAXIS	NO	21	42.0%
	YES	29	58.0%
HEADACHE	NO	30	60.0%
	YES	20	40.0%
TOOTH ACHE	NO	47	94.0%
	YES	3	6.0%
PROPTOSIS	NO	45	90.0%
	YES	5	10.0%
PALATAL BULGIN	NO	43	86.0%
	YES	7	14.0%
CHEEK SWELLING	NO	40	80.0%
	YES	10	20.0%
VISUAL ACUITY	NO	43	86.0%
	YES	7	14.0%
VISIBLE NASAL MASS	NO	25	50.0%
	YES	25	50.0%
Nasal mass	Neoplastic	19	38.0%
	Non-Neoplastic	31	62.0%
	Total	50	100.0%

**TableII: Distribution of Neoplastic, Type of neoplasia, Malignant, Type of non neoplastic lesion, HPE, X-ray group and CT findings**

		Frequency	Percent
Neoplastic	Benign	7	36.8%
	Malignant	12	63.2%
	Total	19	100.0%
Type of neoplasia	Fibrous dysplasia	2	28.6%
	Heman gioma	1	14.3%
	Inverted papilloma	2	28.6%
	Nasopharyngeal angiofibroma	1	14.3%
	Rec inverted papilloma	1	14.3%
	Total	7	100.0%
Malignant	Adenocarcinoma	1	8.3%
	Esthesioneuroblastoma	1	8.3%
	Low graded transitional cell type SCC	1	8.3%
	Metastatic clear cell CA	1	8.3%
	Mod diff SCC	1	8.3%
	NHL	1	8.3%
	Sarcoma maxilla	1	8.3%
	Well differentiated SCC	2	16.7%
	Transitional cell type SCC	2	16.7%
	Undiff non ker SCC	1	8.3%
	Total	12	100.0%

Type of non neoplastic lesion	Antro-choal polyp	19	61.3%
	Ethmoidal polyp	5	16.1%
	Nasolabial cyst	2	6.5%
	Rhinolith	1	3.2%
	Rhinosporidiosis	4	12.9%
	Total	31	100.0%
	HPE	Adenocarcinoma of maxilla	1
Allergic polyp		5	10.0%
Esthesio neuroblastoma		1	2.0%
Fibrous dysplasia of maxilla.		2	4.0%
Heman gioma		1	2.0%
Inflam polyp		19	38.0%
Inverted papilloma		2	4.0%
Low graded transitional cell type SCC of Nasopharynx		1	2.0%
Metastatic clear cell CA of maxilla.		1	2.0%
Mod diff SCC of maxilla		1	2.0%
Nasolabial cyst		2	4.0%
Nasopharyngeal angiofibroma		1	2.0%
NHL of sino-nasal tract.		1	2.0%
Rec inverted papilloma		1	2.0%
Rhinolith		1	2.0%
Rhinosporidiosis of nose		4	8.0%
Sarcoma maxilla		1	2.0%
Well Diff SCC of maxilla		2	4.0%
Transitional cell type SCC of maxilla.		2	4.0%
Undiff non ker SCC of nasopharynx.		1	2.0%
Total	50	100.0%	
X-ray group	Negative	28	56.0%
	Positive	22	44.0%
	Total	50	100.0%
CT findings	Negative	5	10.0%
	Positive	45	90.0%
	Total	50	100.0%

**Table III: Association of age, type of benign lesion, age (years), type of malignant lesion with gender**

		Female	Male	TOTAL	Chi-square	p-value
Age (Years)	≤29	1	18	19	7.39	0.1165
	Row %	5.3	94.7	100.0		
	Col %	7.7	48.6	38.0		
	30-39	5	10	15		
	Row %	33.3	66.7	100.0		
	Col %	38.5	27.0	30.0		
	40-49	5	7	12		
	Row %	41.7	58.3	100.0		
	Col %	38.5	18.9	24.0		
	50-59	1	1	2		
	Row %	50.0	50.0	100.0		
	Col %	7.7	2.7	4.0		
60-69	1	1	2			
Row %	50.0	50.0	100.0			
Col %	7.7	2.7	4.0			
TOTAL	13	37	50			
Row %	26.0	74.0	100.0			
Col %	100.0	100.0	100.0			
Type of benign lesion	Fibrous dysplasia	0	2	2	2.9167	0.5719
	Row %	0.0	100.0	100.0		
	Col %	0.0	33.3	28.6		
	Heman gioma	0	1	1		
	Row %	0.0	100.0	100.0		
	Col %	0.0	16.7	14.3		
	Inverted papilloma	1	1	2		
	Row %	50.0	50.0	100.0		
	Col %	100.0	16.7	28.6		
	Nasopharyngeal angiofibroma	0	1	1		
	Row %	0.0	100.0	100.0		
	Col %	0.0	16.7	14.3		

	Rec inverted papilloma	0 0.0 0.0	1 100.0 16.7	1 100.0 14.3		
	TOTAL	1 14.3 100.0	6 85.7 100.0	7 100.0 100.0		
Age (Years)	≤29	0 0.0 0.0	4 100.0 66.7	4 100.0 57.1		
	30-39	0 0.0 0.0	2 100.0 33.3	2 100.0 28.6		
	40-49	1 100.0 100.0	0 0.0 0.0	1 100.0 14.3		
	TOTAL	1 14.3 100.0	6 85.7 100.0	7 100.0 100.0		

**Table IV: Association of Type of malignant lesion, Type of nonneoplastic lesion and Age (Years) with gender**

		Female	Male	Total	Chi-square	p-value	
Type of malignant lesion.	Adenocarcinoma	0 0.0 0.0	1 100.0 12.5	1 100.0 8.3	7.5000	0.5852	
	Esthesioneuroblastoma	0 0.0 0.0	1 100.0 12.5	1 100.0 8.3			
	Low graded transitional cell type SCC	1 100.0 25.0	0 0.0 0.0	1 100.0 8.3			
	Metastatic clear cell CA	0 0.0 0.0	1 100.0 12.5	1 100.0 8.3			
	Mod diff SCC	1 100.0 25.0	0 0.0 0.0	1 100.0 8.3			
	NHL	0 0.0 0.0	1 100.0 12.5	1 100.0 8.3			
	Sarcoma maxilla	0 0.0 0.0	1 100.0 12.5	1 100.0 8.3			
	WELL diffeSCC	1 50.0 25.0	1 50.0 12.5	2 100.0 16.7			
	Transitional cell type SCC	1 50.0 25.0	1 50.0 12.5	2 100.0 16.7			
	Undiff non ker SCC	0 0.0 0.0	1 100.0 12.5	1 100.0 8.3			
	TOTAL	4 33.3 100.0	8 66.7 100.0	12 100.0 100.0			
	Type of nonneoplastic lesion	Ethmoidal polyp	0 0.0 0.0	5 100.0 21.7			5 100.0 16.1
		Antro-choanal polyp	5 26.3 62.5	14 73.7 60.9			19 100.0 61.3
		Nasolabial cyst	1 50.0 12.5	1 50.0 4.3			2 100.0 6.5
		Rhinolith	1 100.0 12.5	0 0.0 0.0			1 100.0 3.2
Rhinoporioidosis		1 25.0 12.5	3 75.0 13.0	4 100.0 12.9			

	TOTAL	8 25.8 100.0	23 74.2 100.0	31 100.0 100.0		
Age (Years)	≤29	1 8.3 12.5	11 91.7 47.8	12 100.0 38.7		
	30-39	5 41.7 62.5	7 58.3 30.4	12 100.0 38.7		
	40-49	2 33.3 25.0	4 66.7 17.4	6 100.0 19.4		
	50-59	0 0.0 0.0	1 100.0 4.3	1 100.0 3.2		
	TOTAL	8 25.8 100.0	23 74.2 100.0	31 100.0 100.0		

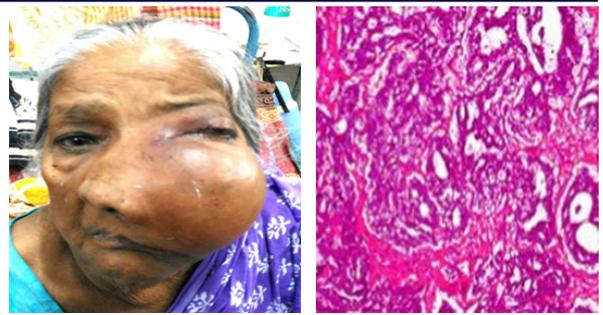
**Table V: Association of age (yrs) and sex with Neoplastic lesion**

		Benign	Malignant	TOTAL	Chi-square	p-value	
Age (yrs)	≤29	4 57.1 57.1	3 42.9 25.0	7 100.0 36.8	5.1862	0.2687	
	30-39	2 66.7 28.6	1 33.3 8.3	3 100.0 15.8			
	40-49	1 16.7 14.3	5 83.3 41.7	6 100.0 31.6			
	50-59	0 0.0 0.0	1 100.0 8.3	1 100.0 5.3			
	60-69	0 0.0 0.0	2 100.0 16.7	2 100.0 10.5			
	TOTAL	7 36.8 100.0	12 63.2 100.0	19 100.0 100.0			
	Sex	Female	1 20.0 14.3	4 80.0 33.3			5 100.0 26.3
		Male	6 42.9 85.7	8 57.1 66.7			14 100.0 73.7
		TOTAL	7 36.8 100.0	12 63.2 100.0			19 100.0 100.0

**Table-VI: Correlation of clinical, radiological and histopathological diagnosis of different type of sino-nasal masses.**

Clinical Diagnosis	Number	Radiological Diagnosis	Number	HPE	
Unilateral Nasal Polyp	17	Unilateral Nasal Polyp	17	Inflam polyp	17
				Allergic polyp	3
Unilateral Sinonasal Mass	7	Unilateral Sinonasal Mass	7	Inverted papilloma	2
				Fibrous dysplasia	2
				Rec inverted papilloma	1
Angiofibroma	1	Angiofibroma	1	Angiofibroma	1
Hemangioma	1	Hemangioma	1	Hemangioma	1
Nasolabial Cyst	2	Nasolabial Cyst	2	Nasolabial Cyst	2
Rhinoporioidosis	4	Rhinoporioidosis	4	Rhinoporioidosis	4
Rinolith	1	Rinolith	1	Rinolith	1
Bilateral Nasal Polyposis	5	Bilateral Nasal Polyposis	5	Allergic polyp	2
				Inflam polyp	2
Malignant	12	Malignant	12	Transitional cell type SCC of maxilla	1
				Well diffeSCC of maxilla	1

			Adenocarcinoma of maxilla	1
			NHL of sino-nasal tract	1
			Esthesio neuroblastoma	1
			Low graded transitional cell type SCC of nasopharynx	1
			Undiff non ker SCC of nasopharynx	1
			Metastatic clear cell CA of maxilla	1
			Transitional cell type SCC of maxilla.	1
			Well diff SCC of maxilla.	1
			Mod diff SCC of maxilla.	1
			Sarcoma maxilla	1



**DISCUSSION**

In this series, 50 cases of sino-nasal masses were studied at from Jan-2015 to June 2016. The sex incidence of the present study shows that male were much more affected than females (in the ratio of 2.8:1) by person who go outside more for their day to day work - males are thus more exposed to the external environment which may have an aggravating factor for causation of the disease more. It was higher (male-to female ratio of 1.7:1) in the study by Zafar et al<sup>2</sup> from India. While a study from Nigeria revealed an opposite ratio showing female preponderance (M:f ratio of 1:1.2). A British review of nasal polyposis reported a ratio at 2:1 (M:F)<sup>3</sup>. Regarding age of the patient it is revealed that patient in their third decade of life (18 - 29 years ) suffered most (38%) from the disease. These group of patient are more prone to atmospheric pollution, mechanical and chemical hazards at working place etc. None of the patients was below the age of 18 years which again support the postulated inference. The second and fourth decade of life are the most vulnerable period for development of sino-nasal masses. Bakari et al<sup>3</sup> had reported a peak incidence of 33 years, while for Zafar et al<sup>2</sup> the mean age of presentation was 22.5 years. Malignancies have been reported generally after the fourth decade of life.

Occupation has also some role in causation of sino-nasal masses. Both these group of patients do suffer from allergy (due to more exposure to dust, pollen grains, smoke etc.) and infection (due to lack of personal hygiene)-now allergy and infection being two important causative factors of sino-nasal masses, these two groups suffer more<sup>4</sup>. In the present study rhinosporidiosis was more common among farmer and pond bathers. Rhinosporidiosis was the second most common nasal masses (12.9%) - this tally with the observation of Satyanarayan (1960) who mentioned rhinosporidiosis was endemic in India. The two cases adenocystic carcinoma of maxilla and ethmoid of the present study occurred in a wood-worker. Duration of illness in most of the cases (36%) was between 1-6 months from the occurrence of first symptoms<sup>9</sup>. It can be interpreted as the mass growing gradually and it takes considerable amount of time for the patients to realize the complaints associated with the disease. From detailed history it was found that all the 50 patients had their chief complains in nose. But there were considerable number of patients who complained of problems related to other associated organs e.g. headache, toothache bulging of eye, bulging of palate, cheek swelling, dimness of vision, double vision, watering of eyes etc. Five patients (10%) had past history of operative interference before attending for the present complaint. Half of the cases of ethmoidal polyp had history of polypectomy before removal of ethmoidal polyps<sup>1</sup>. One or two polyps may remain unattended as full removal of all ethmoid cells are not possible. One of cases of inverted papilloma had operative interference twice in the form of Caldwell Luc's operation 3 years back and partial maxillectomy 1 year back<sup>11,12</sup>. This finding corroborates with the previous studies who said that inverted papillomas are notorious for recurrence. The only case of adenoid cystic carcinoma of maxilla had history Cald Well-Luc's operation 5 years back<sup>12</sup>.

One of the cases of antro-choanal polyp was treated by simple polypectomy 1 year back History of allergy was present in most of the cases of antrochoanal and ethmoidal polypi. History of bronchial asthma was found in one of cases of antro-choanal polyp supported by Samter and Beers, 1968. Fortysix of the patients (92%) had nasal obstruction which meant that the mass was definitely obstructing the nasal airway. Antro-choanal polyp, rhinosporidiosis, inverted papilloma, nasolabial cyst, haemangioma etc. had unilateral obstruction; whereas ethmoidal polyp, fibrous dysplasia of maxilla, carcinoma of maxilla etc. had bilateral nasal obstruction<sup>13,14</sup>.

The nasal masses which were exposed to the outside air become infected resulting in nasal discharge on an off either unilateral or

A total number of 50 cases were studied for 1 year. All the sino-nasal masses were categorized into non-neoplastic and neoplastic. The age ranged from 18 to 69 years with mean age of 33.00. It was found that from the above table it is seen that out of 50 patients, 37 (74%) were male and 13 (26%) patients were female. The male and female ratio was 2.8:1. We found that the commonest decade of presentation of sino-nasal masses was third decade of life (i.e. 18-29 years of age). It was found that majority of the patients in the presents series were students (30%) followed by housewife (22%) and businessman (14%). It was found that patients came with duration of symptoms of illness ranging between one month to thirty seven months. We found that out of 50 patients only five (10%) patients had past history of operative interference whereas rest (90%) has no history of operative interference before.

We found that thirty five patients (35) had nasal discharge (70%), forty six patients (92%) had nasal obstruction, twenty nine patients (52%) had history of nasal bleeding, twenty five patients (50%) had visible nasal mass. Nasal obstruction was the most common (92%) presenting complaint. Headache (40%), cheek swelling (20%), H/o allergy (24%) and eye related symptoms (14%) were other common symptoms. Facial pain and external deformity were demonstrated in minority of patients.

It was found that nonneoplasia (62%) outnumbered their neoplastic counterpart in case of sinonasal masses. We found that malignant neoplasia (63%) outnumbered their benign (37%) counterpart in case of sino-nasal masses.

It was found that the benign lesions were commonly affected the age group of 18-29 years and malignant lesion were commonly affected the age group of 40-49 years. In neoplastic lesion the prevalence was 73.7% among males and it was 26.3% among females.

It was found from above table it is noted that Males dominated (60.9%) in cases of antrochoanal (inflammatory origin) polyp where as females dominated (21.7%) in cases of ethmoidal polyp (allergic origin).

We found that Positive CT indicated soft tissue mass involving maxilla, ethmoid, nasal cavity, oropharynx along with break of medical wall of maxilla or floor of orbit etc. All of the 45 (90%) cases where CT was done showed positive findings either single or in combination.

In our study we found that all 50 patients underwent CT scan. On the basis of radiology, out of 50 patients, 31 patients (62%) were non-neoplastic, 7 patients (36.84%) were benign, and 12 patients (63.16%) were malignant. In all the 50 patients, clinical diagnosis correlated with the radiologic diagnosis.

bilateral depending on the site of the site of the tumour.

Bleeding per nose was a constant feature of malignant lesion of nose and nasal cavities, rhinosporidosis and inverted papilloma the nasal bleeding was unilateral whereas bilateral bleeding was the rule of malignant lesion (probably because they erode nasal septum early to occupy both the nasal cavities). Headache was seen in some cases of antro-choanal polyp, sarcoma maxilla, rhinosporidosis, fibrous dysplasia of maxilla, esthesioneuroblastoma etc.<sup>7,11</sup>. Causes of headache in case of antro-choanal polyp and rhinosporidosis may be due to associated maxillary nerves. Headache in case of fibrous dysplasia was due to enormous size of the mass. Toothache and palatal bulge were seen in case of squamous cell carcinoma of maxilla, fibrous dysplasia of maxilla and esthesioneuroblastoma. In all the cases toothache was due to involvement of the palate and gum either by erosion or by pressure effect. Proptosis was associated with esthesioneuroblastoma, adenocarcinoma of maxilla, fibrous dysplasia of maxilla. In the former two cases erosion of the floor of the orbit was the cause of proptosis whereas in third and fourth cases expansile tumour mass caused the orbit to be displaced outwards. In all the cases the proptosis was of eccentric type i.e. the eyeball was pushed anteriorly and laterally. Cheek swelling was observed in case of nasolabial cyst, fibrous dysplasia of jaw, and esthesioneuroblastoma, due to forward bulging of the antero-lateral wall of maxilla.

Visual acuity was diminished in the case of esthesioneuroblastoma, adenocarcinoma of maxilla and ethmoid, and it was absent (i.e. blind), in case of the massive fibrous dysplasia of right maxilla. This again can be attributed to the involvement of the orbit and optic nerve by the tumour mass. Anterior and posterior rhinoscopic examination were done routinely which revealed unilateral nasal mass in cases of haemangioma, nasolabial cyst, antro-choanal polyp, rhinosporidosis, inverted papilloma, rhinolith etc. Bilateral presentation of the mass was seen in ethmoidal polyp, malignancy of maxilla, fibrous dysplasia etc.<sup>13,14</sup>.

Haemangioma, nasolabial cyst, rhinosporidosis, inverted papilloma, rhinolith, malignancies, fibrous dysplasia, etc. were seen mainly in anterior rhinoscopy whereas antro-choanal polyp was seen in posterior rhinoscopy. Apart from ethmoidal polypi all other nasal masses were single in number although rhinoscopy may have revealed broad base, multinodular appearance etc. (because they arise from a single structure). But ethmoidal polypi were multiple in number because they arise from multiple ethmoidal air cells.

Antro-choanal polyp, ethmoidal polypi, naso-labial cyst etc. were pale oedematous compressible painless and did not bleed to touch. But masses of malignancy, inverted papilloma, rhinosporidosis were pink or reddish in colour (due to increased vascularity and / or ulceration) noncompressible and bleed to touch. Rhinosporidosis had a special appearance with granular surface studded with minute white dots (sporangia). Radiological investigation were done in all the 50 cases which included x-ray of paranasal sinuses (occipito-mental view or Water's view), x-ray chest (posterior-anterior view) and CT scan of nose and paranasal sinuses (both plain and contrast study).<sup>7,16</sup>

X-ray of the paranasal sinuses (occipito-mental view) was done in all cases-positive findings were seen in 38 patients (76%). Positive findings indicated as the presence of any of the following abnormalities e.g. opacity of maxillary sinuses, frontal sinuses, ethmoidal sinuses, opacity in nasal cavity, destruction of bone orbit, polypoidal mucosa in maxillary antrum etc.

In all cases of antro-choanal polyp radio-opaque shadow was noted in one or both maxillary sinuses with sometimes polypoidal mucosa in it. In ethmoidal polyp bilateral opacity in ethmoidal sinuses with or without opacity in maxillary sinuses was noted. One of the cases of rhinosporidosis showed opacity in respective nasal cavity and maxillary antrum.

One of the inverted papilloma (showed opacity in nasal cavity whereas the other one revealed mass both in the nasal cavity and maxillary antrum-but there was no bone destruction. Fibrous dysplasia showed dense opacity of maxilla while one case of fibrous dysplasia demonstrated hollowed out enlarged right maxilla.

Malignant lesion showed either opacity or soft tissue mass of the sinuses or loss of bone outline of the surroundings structure e.g. squamous cell carcinoma of maxilla showed breach of the floor of

the antrum. X-ray chest PA view: was done in cases of suspected malignancies to see if there was any metastatic lesion in lung—but no distant metastasis in chest was seen in any case.

CT scan was done in 45 cases to note the extent of the lesion as well as destruction of surrounding bones and involvement of intracranial structures. The case of adenoid cystic carcinoma of maxilla revealed mass in left medial wall of maxilla with destruction of the floor of orbit causing proptosis. CT scan of sarcoma of maxilla showed soft tissue mass involving right maxilla-ethmoidal complex without any evidence of bone destruction. The case of Esthesioneuroblastoma revealed skull base extensive lesion involving frontal lobe, nasal cavity, cavernous sinus, seller extension, bone destruction with blockage of right osteo-meatal complex. CT scan report of squamous cell carcinoma of left maxilla revealed mass in left maxillary antrum with extending into oropharynx<sup>7,15,16</sup>.

Another case of moderately differentiated squamous cell carcinoma of maxilla showed right sided sino-nasal polyp involving right maxilla, ethmoid sinus, sphenoid sinus extending into right orbit<sup>11,13</sup>.

In case of metastatic clear cell carcinoma of left maxilla, the CT scan report revealed malignant mass in left maxillary sinus extending to left ethmoid. Frontal sinus, bone erosion with defect and extension to left nasal cavity, left orbit, and cribiform plate of left ethmoid.

CT scan report of transitional cell type squamous cell carcinoma of right maxilla revealed diffuse soft tissue opacity in both maxillary sinuses mainly right maxillary sinus with obliteration of right osteo-meatal complex.

In the second case of fibrous dysplasia, CT scan report was massive growth of right maxilla, frontal bone with indentation of frontal lobe and proptosis. The case of recurrent inverted papilloma had mass confined to nasal cavity and right maxillary antrum without any bone destruction<sup>7</sup>.

## CONCLUSION:

Based on the present study the following conclusion can be drawn-

- Most of the sino-nasal masses are seen in male patients.
- Most of the patients are in third decade of their life (i.e. 18-29 years of age).
- Nasal polyp is the commonest sino-nasal mass and most common benign lesion while squamous cell carcinoma is the most common malignant tumour of the sino-nasal tract.
- Causative factors of malignant sino-nasal masses are environmental pollutions, smoking and chronic infection (resulting in sinusitis and polyposis)
- HPE gives the final verdict about the correct nature of the growth (e.g. benign or malignant) and it is extremely essential for proper planning of further treatment modality. The radiological, clinical findings and HPE are in perfect correlation with each other.

## Compliance with Ethical Standards

**Conflict of interest:** The authors declare that there is no conflict of interest.

**Ethical Approval:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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- treatment plan, certain benign tumor have high potential for malignant transformation while others can present with locally destructive features and deformities.
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